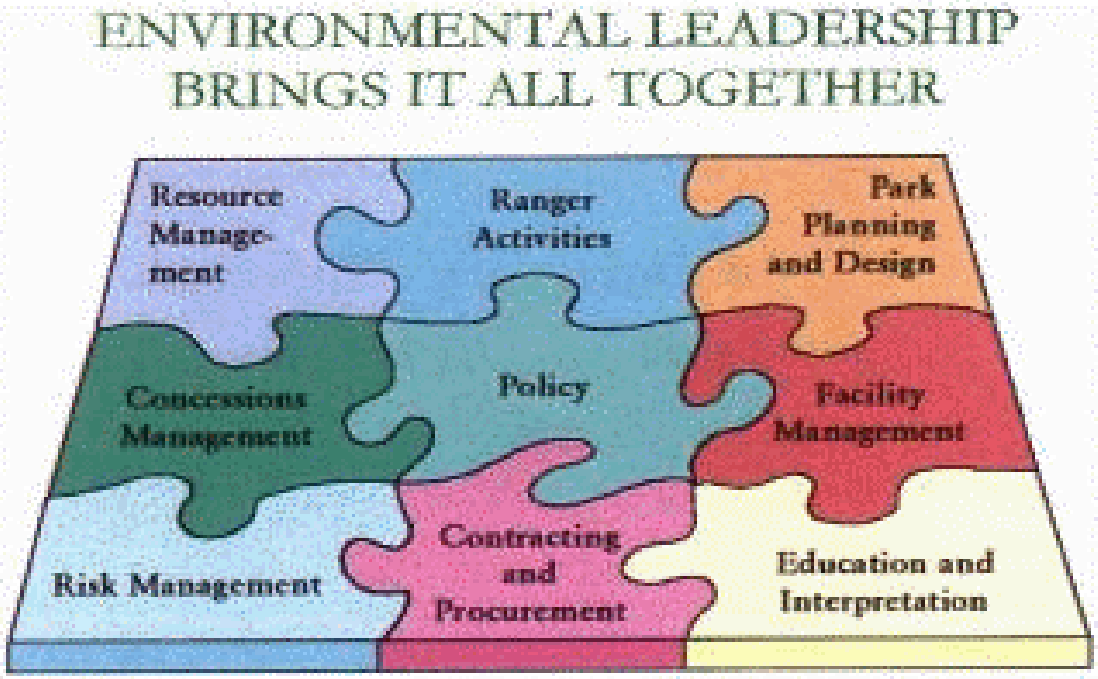
ENVIRONMENTAL LEADERSHIP IN THE NATIONAL PARKS



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Or- Greening the National Parks with Biodiesel

Biodiesel and biodiesel blends are significantly reducing several National Parks utilization of nonrenewable fuel resources.

Biodiesel also has the potential to make some park operations petroleum free.

Biodiesel is just one of the important tools incorporated into the sustainability programs at the park level.

Channel Islands National Park

- Consists of five islands and the surrounding mile of ocean, totaling 249,489 acres.
- The Park is one of the least visited in the system with less than 70,000 visitors on the islands per year.
- The isolation of the islands has protected them from development but now challenges park management in providing energy services.

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Man has visited the islands for thousands of years,

although in limited numbers.

At and around the islands visitors will find marine life ...

Plants Endemic to the Islands …

The Island Fox …

An Endangered Species.

The remains of the Pygmy Mammoth …

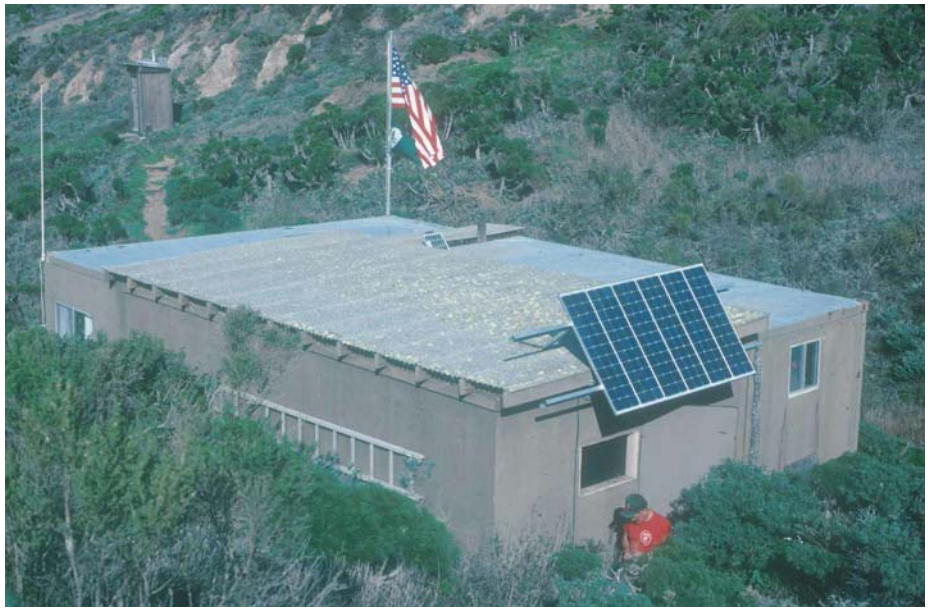
Spectacular Vistas …

And a variety of sustainable practices in use.

For over 25 years staff at the park have harnessed renewable energy resources.

- In the beginning solar energy created power for use in communications and later for lighting in small field stations.

- Systems were small scale and provided 12 volt direct current electricity.



Currently the Park has 76 renewable energy systems in use.

Providing 29 kW of Remote Power for

- Water Pumping-
- Communications-
- Resource Monitoring-
- Facility Power-
- Solar Thermal-

In 1982 the Park installed the first large scale solar system on Anacapa Island.

- Prior to the solar installation over 8,000 gallons of diesel were used annually to generate electricity on the island.
- After reconfiguration and fine tuning the annual consumption of fuel has now dropped to under 263 gallons.
- The lighthouse also went solar saving an additional 7,500 gallons.

- Anacapa Island is now petroleum free through the use of biodiesel.

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In 1990 the Ranger Station on Santa Barbara Island was constructed and is powered by stand alone photovoltaics.

The 4 kW array provides the energy for the station.

- The system precluded the use of over 4,000 gallons of diesel annually.
- During installation I "forgot" to install the diesel engine generator.
- The only fuel used on the island is for a hydraulic dock crane which uses less than 100 gallons of biodiesel per year.
- Santa Barbara Island is also petroleum free.

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On Santa Rosa Island a Diesel/Wind/Solar Hybrid System further reduced diesel use by over 12,000 gallons per year.

- At this time between 600-900 gallons of fuel is used per month for vehicle, equipment and generator operations.
- Currently the park is entering into a partnership which will provide B-100 for generation and B-20 for vehicle and equipment operations.

Clean Cities

Green Energy Achievements @ Channel Islands National Park.

- Over 28,000 gallons of diesel fuel used for generation on the islands has been eliminated or precluded through the utilization of renewable energy systems.

  - Annual Emission Savings =
  - 333 Tons of Carbon Dioxide.
    16,000 Pounds of Nitrous-Oxides.
    616 Pounds of Total Suspended Particulates (TSP)
    1372 Pounds of Hydrocarbons.
    800 Pounds of Sulfur Dioxides.
    2,300 Pounds of Carbon Monoxide.
    And don't forget the motor oil use and generation of hazardous waste.

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Alternative Fueled Vehicles.

- 54% of our mainland fleet are AFVs.

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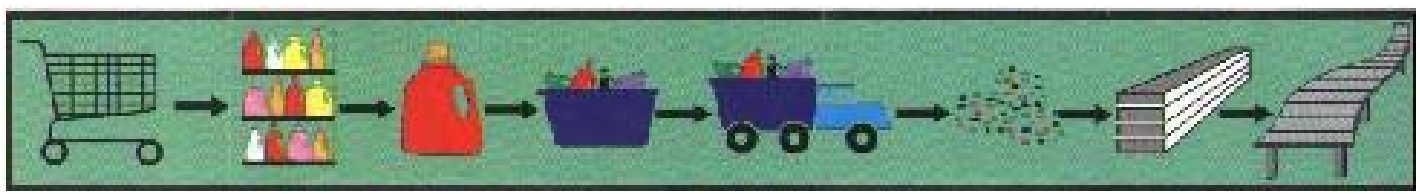
"Recycling @ Work"

- 1999 NPF & Unilever provided decking material made from recycled detergent bottles for the HQ deck.
- 2001 Program included picnic tables, benches and recycling bins.



Water Conservation

- Low flush toilets on the islands reduced water shipping requirements by 65%.

Anacapa Island now uses less than 35,000 gallons of water per year.

- Waterless Urinals @ Park HQ each save over 40,000 gallons of water per year.

Energy Conservation is an integral part the equation.

- Compact fluorescent lights are used.
- Energy efficient refrigeration and other appliances are key.
- Passive lighting and skylights are designed into the buildings.
- 2001/02 Program of T12/T8 replacement and lighting controllers for Park HQ.

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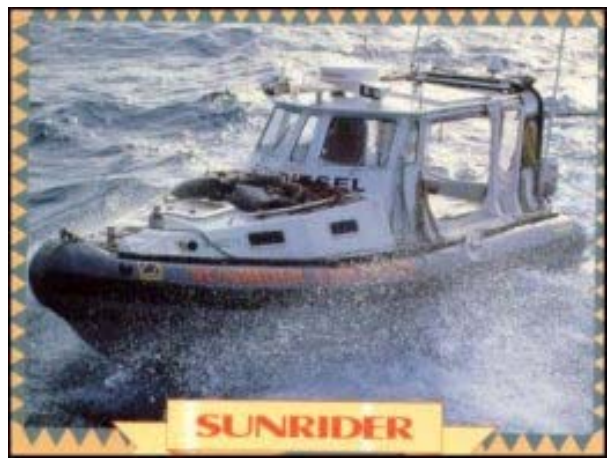
Even with these accomplishments

The Park faced a large energy demand

With the islands moving towards energy independence the park staff began focusing on the largest user of fuel in the park.

Marine Transportation.

- Annually over 70,000 gallons of diesel fuel is used by the parks boat fleet.
- Options were limited due to operational demands.
- An article in a solar journal on the Sunrider hit the spot.
- For over seven years I've had a biodiesel sample sitting on my desk.

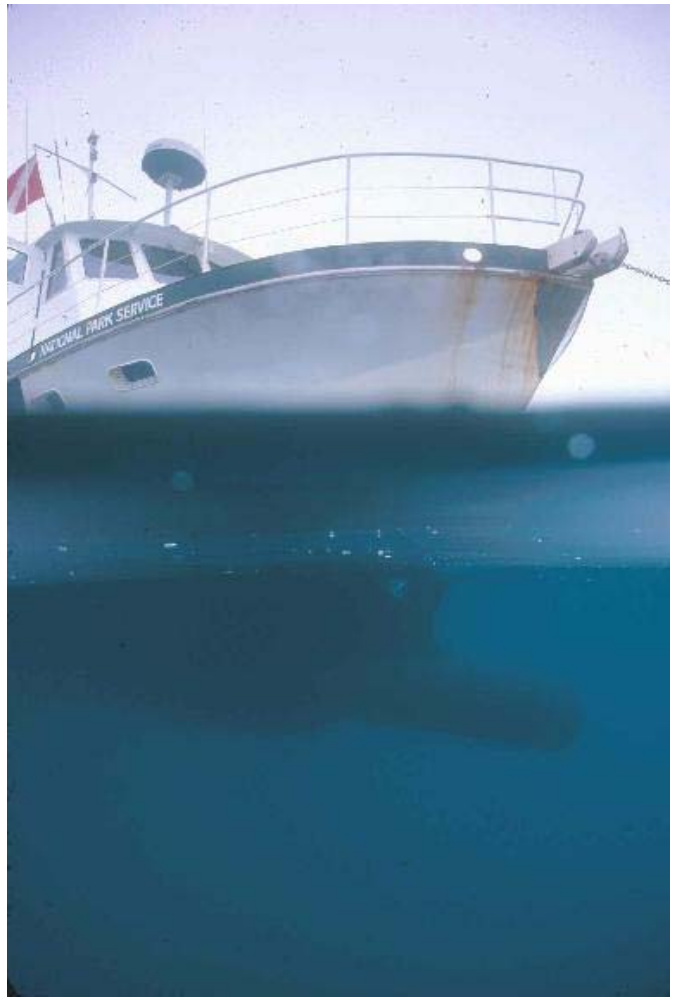


Marine Biodiesel Program

- In 1998 a funding request thorough the "Green Energy Parks" program identified a project to operate one of the parks research vessels on B100 along with fuel for Anacapa and Santa Barbara Islands.
- In August 2000 the park biodiesel program was implemented.
- To date the park has used over 30,000 gallons of biodiesel.

"Greening the Pacific Ranger"

During the past 22 years the Pacific Ranger has consumed over 200,000 gallons of diesel fuel. To reduce the environmental impact of this operation several changes have been accomplished-



56' Steel Hull

“Greening the Pacific Ranger”

- Lubricating Oils- Only re-refined oil is utilized on the boat.
- Electrical Generation- Battery storage and a 110/220 volt inverter provide cabin electricity and reduced generator run time by 65%.
- Bulbous Bow- Installation of a "Bulbous Bow" reduced friction and wake resistance on the hull as it travels through the water, allowing the vessel to travel farther while operating at the same engine RPM and fuel consumption. The fuel savings have averaged 18% and has corresponded in reduced exhaust emissions.

- Biodiesel- In August 2000 the Pacific Ranger began operating on B100. To date the boat has used over 15,000 gallons of biodiesel. One mechanical failure due to a bad fuel line occurred in September 2001 which caused the generator to require repairs. In January 2002 neoprene gaskets in the fuel tank failed.

“Greening the Pacific Ranger”

- In 2001 the project received several Award Recognition's including-

- The White House Closing the Circle Award
- The Federal Energy Management Award
- Department of the Interior Environmental Achievement Award Honorable Mention

"Sea Ranger II"

- Launched in October 2001
- Powered by twin Caterpillar 3406 engines specified for neat biodiesel.
- Average biodiesel use @ 800-1,000 gallons per month.

58' Fiberglass

More to Come

- The next step is to begin convert the remaining park operations to either B20 or B100.
- The park is currently finalizing plans to begin testing an additional 20,000 gallons of B100 from fuels produced in Ventura County.

- The ultimate goal would be to make the park "Petroleum Free"

More to Come

- Vehicle and Equipment Operations on Santa Rosa and Santa Cruz Islands- 5 generators, 23 vehicles (14 GSA) and 16 pieces of equipment.
- The Ocean Ranger, 100’ Crew Boat, 3 GM 60 Series, 535 HP Mains, re-engined January 2003
- The Surf Ranger, 74’ LCM-8 Landing Craft 4 GM 672s in 6 pack configuration.
- Requiring an additional 35-40,000 gallons of B100 per year.

BIODIESEL IN THE NATIONAL PARKS

Yellowstone National Park, The University of Idaho and the Montana Department of Environmental Quality first pioneered biodiesel with the "Truck in the Park Program". The project placed an unaltered diesel pickup truck into service in Yellowstone National Park, fueled the truck with 100 percent rapeseed ethyl ester, and monitored performance and emissions.

The program started in 1995 and has since demonstrated biodiesel use in all weather conditions while covering over 140,000 mile of operation.

BIODIESEL IN THE NATIONAL PARKS

- In 1988 a partnership between the US Department of Energy and the National Park Service was created.
- This "Green Energy Program" has promoted the application of a variety of sustainable energy programs in National Park Areas.
- Fourteen National Park areas piloted biodiesel utilization through this program and several other parks began biodiesel utilization on their own.

BIODIESEL IN THE NATIONAL PARKS

Assateague Island National Seashore
Channel Islands National Park
Everglades National Park
George Washington Memorial Parkway
Glacier National Park
Grand Teton National Park
Harpers Ferry National Historic Park
Hawaii Volcanoes National Park
Manassas National Battlefield Park
Mount Rainier National Park
National Capitol Parks East
Pictured Rocks National Seashore
Redwoods National Park
Rock Creek Park
Scotts Bluff National Monument
Sleeping Bear Dunes National Seashore
Voyageurs National Park
Yellowstone National Park
Yosemite National Park

- **At the present time over 650 pieces of equipment and vehicles are being operated at the 19 parks listed above- The spread sheet is quite informative. http://www.nps.gov/renew/NPSBiodiesel.xls**

BIODIESEL IN THE NATIONAL PARKS

Assateague Island National Seashore

Berlin, Maryland and Chincoteague, Virginia

All park operations are using B20, equipment, trucks and standby generation. Annual fuel consumption 8,000 gallons.

BIODIESEL IN THE NATIONAL PARKS

Channel Islands National Park

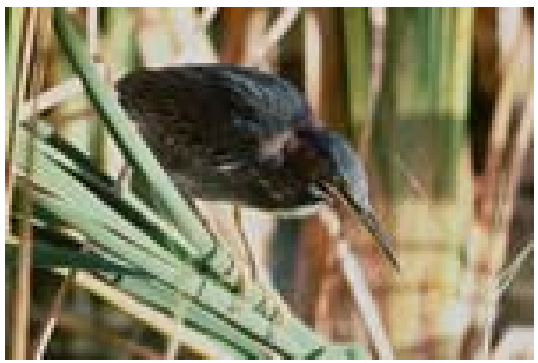
Ventura and Santa Barbara, California

BIODIESEL IN THE NATIONAL PARKS

Everglades National Park

Miami, Naples, and Homestead, Florida

Small user of biodiesel with B100 being used for roadside mowing operations.



BIODIESEL IN THE NATIONAL PARKS

George Washington Memorial Parkway

Northern Virginia and Maryland

Annual Fuel Order 22,000 Gallons B20

North district operating 75 pieces of equipment including, trucks, tractors, chipper and mowers on B20.

BIODIESEL IN THE NATIONAL PARKS

Glacier National Park

Northwest Montana

In the fall of 2002 converted park operations to B20 and is the newest player on the block.

The park is operating 63 pieces of equipment and vehicles on B20 ranging from vehicles to construction equipment and including snow removal on the Going to the Sun Highway.

BIODIESEL IN THE NATIONAL PARKS

Grand Teton National Park

Moose, Wyoming

Operates 58 pieces of equipment and vehicles on B20 during the summer and B10 in the winter. Annual fuel use- Summer 40-45,000 gallons B20, Winter 60-65,000 gallons of B10. Operations range from generation to the 12V92's on the snow blowers used throughout the winter.

BIODIESEL IN THE NATIONAL PARKS

Harpers Ferry National Historic Park

Harpers Ferry, West Virginia

Annual Fuel Order 25,000 Gallons B20 for use in six 35’ shuttle busses. Other park use includes mowers, tractor and for a dump truck.

Shuttle buses mfg. 1990
Cummins L10, 280 hp.

BIODIESEL IN THE NATIONAL PARKS

Hawaii Volcanoes National Park

Hilo, Hawaii

On the big island, park operations for roadside mowing, heavy equipment and generation are on B100 with some blended fuel use. Due to logistics, at times B100 is purchased for less cost than petroleum diesel.